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NOTES FROM THE WOODS HOLE LABORATORY,—1932<sup>1</sup>

I. F. LEWIS AND W. R. TAYLOR

(Plate 274.)

THE DAVID STARR JORDAN ALGAE FROM PENIKESE ISLAND.—A small package of specimens of marine algae was found at Stanford University, annotated as being from Penikese Id. and collected by Dr. Jordan, presumably during the time he spent there at the Agassiz laboratory (Alexander School of Natural History). Through the kindness of Prof. G. M. Smith they were sent to the writers at the Marine Biological Laboratory for study and deposit. When seen by Prof. B. M. Davis, he recognized the specimens as some which he had found among Jordan's materials after the Penikese visit, and had annotated as to collector and station. In view of the prominence attained by the collector, and the fact that they probably represent the evidence underlying part of his earliest scientific work, they acquire a special significance. Like almost all algal collections of the period (*ca.* 1873) the specimens are very small, but in nearly every case remain in determinable condition. While the writers' verdict as to species represented does not always coincide with the name inscribed on the mount, few alterations in the published list are suggested thereby.<sup>2</sup>

The specimens number over 40 groups, though a considerably lower number of species. It would be idle to record here changes in specific

<sup>1</sup> Printed with aid of a grant to RHODORA from the National Academy of Sciences. Plate 274 is numbered out of sequence in the volume owing to the long series of consecutive plates in the continued paper upon Newfoundland.

<sup>2</sup> Jordan, D. S. The flora of Penikese. *American Nat* 8: 193–197. Apr. 1874.



assignment or in synonymy which do not affect the published lists.<sup>1</sup> Apart from such, some items seem to call for special mention. The following were found present in the collection, although unreported or erroneously named, by Jordan. On sheets originally labeled *Gelidium corneum* though corrected in pencil, appeared *Lomentaria uncinata* Menegh. There is a record of *G. corneum* in the 1874 list, but it is not authentically reported from the district. Originally labeled *Griffithsia corallina* and in pencil *G. Bornetiana* was material properly designated *G. globulifera* Harv. The specimens originally labeled *Polysiphonia nigrescens* were sorted into that species, *P. urceolata* (Dillw.) Grev. and *P. atrorubescens* Grev. Of the original collection *P. affinis* and sundry other mislabeled specimens seem to be *P. violacea* Grev., which name has but recently been brought into question.<sup>2</sup> This does not appear to be an appropriate place to assume the nomenclatorial changes involved, so the familiar practice is retained. A mixture, primarily *Antithamnion cruciatum* (C. Ag.) Naeg., with *Callithamnion roseum* (Roth) Harv. and *C. corymbosum* C. Ag., was originally labeled *Antithamnion americanum*. The specimens of *Chondriopsis tenuissima* were the slender plant often called *Chondria Baileyana* (Mont.) Harv. The specimen of *Phyllophora Brodaeii* is more correctly *P. membranifolia* (G. & W.) J. Ag. The specimens of *Ceramium diaphanum* were all *C. fastigiatum* (Harv.) Ag., although the former is certainly to be expected on the island; *C. arachnoideum* proves to be simply a small *C. rubrum* (Huds.) C. Ag. Only *Lomentaria uncinata*, *Polysiphonia atrorubescens* and *Callithamnion roseum* are additions to the recorded flora, as they appear neither in the 1874 or 1924 lists.

It is not possible absolutely to exclude names from the list on the basis of changes in assignment of the specimens received, because this collection is far from complete, and a considerable number of Jordan's names, including some doubtful ones, are unrepresented by specimens. However, the presumption against the presence of *Gelidium corneum* and *Griffithsia corallina* is strengthened; the other names confirmed as incorrectly used are of plants already known to be found at Penikese, or which may reasonably be expected. There remains a residue of species reported by Jordan which are to be

<sup>1</sup> Lewis, I. F. (Edit.). The flora of Penikese, fifty years after. *Rhodora* 26: 181-195, 211-219, 221-229. Oct., Nov., Dec., 1924.

<sup>2</sup> Tandy, G. Notes on phycological nomenclature, I. *Jour. of Bot.* 69: 225-227. 1931.



expected, but were not found among his specimens nor in the 1924 collections. Of eight mentioned in the 1924 paper as the most notable among these, three have recently (1931) been collected: *Enteromorpha clathrata* (Roth) Grev. (L. M. Perry), *Cladophora gracilis* (Griff.) Kg. (C. Moore) and *Callithamnion Baileyi* Harv. (B. Andrew).

If time could be given to thorough collecting on the island more effective completion of the list might be expected, but as the visits are always made in the interests of groups of as yet inexperienced students, the "finds" are more by accident than design. Material of *Trailiella intricata* Batters (H. T. Croasdale) and *Asparagopsis hamifera* (Hariot) Okam. have also been secured, probably recently introduced in the course of their spread in the Buzzards Bay district. As early as 1925<sup>1</sup> there was secured on Penikese an alga, at first indeterminate, later described as *Acrothrix novae-angliae* Taylor, which during 1926–1927 became more abundant, and which has persisted as an occasional element of the flora of the district. Since this note attempts to assemble records supplementary to the 1874 and 1924 lists, four other species should be mentioned. In the herbarium of one of the writers (W. R. T.) there appears a specimen of *Scinaia furcellata* (Turn.) Bivona purporting to have been collected on Penikese Id. 31 July 1890 by S. Burrage, received in a distribution from W. A. Setchell. In the general catalog of the algae of the Woods Hole area B. M. Davis<sup>2</sup> lists a few algae from Penikese stations, including *Dictyosiphon hippuroides* (Lyngb.) Aresch., *Agardhiella tenera* (J. Ag.) Schmitz, and *Polyides rotundus* (Gmel.) Grev., which seem otherwise unrecorded. *Myriotrichia clavaeformis* Harvey (W. R. Taylor) was found in abundance upon *Scytosiphon* at Penikese 8 July 1930.

PENIKESE LICHENS OF THE 1924 SURVEY.—A few lichens were collected by the mycological squad during this survey, but no account of them was available at the time report was made. Ultimately a list of determinations made by the late Prof. Bruce Fink was kindly transmitted by Dr. C. W. Dodge. The 20 collection numbers cover 10 species, all still represented by one number in the Fink lichen herbarium at the University of Michigan, the complete series being at the Farlow Herbarium, Harvard University.

<sup>1</sup> Taylor, W. R. A species of *Acrothrix* on the New England coast. *American Jour. Bot.* 15: 577–583. 1928.

<sup>2</sup> Davis, B. M. General characteristics of the algal vegetation of Buzzard's Bay and Vineyard Sound in the vicinity of Woods Hole. *Bull. (U. S.) Bur. Fisheries* 31 (1): 443–544, (2): 795–833. 1913.



CLADONIA CONIOCRAEA (Floerke) Spreng. On soil.	PARMELIA CAPERATA (L.) Ach. On trees.
CLADONIA FUSCATA (Huds.) Spreng. On soil.	PARMELIA SULCATA Tayl. On trees.
CLADONIA SYMPHYCARPA (Ach.) E. Fries. On moss over soil.	RAMALINA CALICARIS (L.) E. Fries. On branches.
LECANORA ALLOPHANA (Ach.) Nyl. On bark.	PHYSCIA STELLARIS (L.) Nyl. On bark.
LECANORA HAGENI Ach. On gran- ite.	XANTHORIA PARIETINA (L.) T. Fries. On trees.

CHANGES IN THE WOODS HOLE ALGAL VEGETATION.—The interval since the preparation of the last series of Notes<sup>1</sup> has seen curious shifts in the incidence of certain notable elements of the flora. The behavior of *Trailliella intricata* is especially remarkable. First coming to our attention in 1927, it increased in abundance and largely replaced *Spermothamnion Turneri* (Mert.) Aresch. in its favored habitats, and consequently as a dominant element in the algae drifted ashore over large stretches of the coast at certain periods. The writer believes that he noted a marked reduction in the abundance of *Trailliella* in 1931, extended in 1932, and the future of the genus will be watched with great interest. If it parallels that of *Acrothrix novae-angliae* it may continue to decrease until the plant is rare. The later species, first detected 1925, became frequent at certain station in 1928, but by 1931 was again a rarity, though still found as occasional specimens and in 1932 became abundant cast upon the Ganset Tract beach during a brief period. *Trailliella*, presumably an introduction, reached a really prominent position in the flora, while *Acrothrix*, described as native, did not do so. The history of *Dumontia filiformis* (Fl. Dan.) Grev. and *Asparagopsis hamifera* (Hariot) Okamura is still one of increase, the former being a substantial floral element on certain shores in early summer, while the latter is no longer an extreme rarity and the plants found are far larger and better developed than those originally reported and figured,<sup>1</sup> although extremely tangled types of growth are also found. It was abundant at Penikese Id. in 1932. The curious large Myxophycean introduction, *Brachytrichia Quoyi* (Ag.) Born. & Flah., continues to be sporadic. Abundant at Scraggy Neck in 1920, after several years of unsuccessful search it appeared again in abundance in the late summer of 1930 (H. T. Croasdale) at one of its old stations (Hadley

<sup>1</sup> I. F. Lewis and W. R. Taylor. Notes from the Woods Hole Laboratory—1928. *Rhodora* 30: 193–198. 1928.



Harbor, Naushon Id.), repeating in very small quantity in 1931. No changes in the longer-known flora have been as marked as in these just mentioned, although *Lomentaria rosea* (Harv.) Thuret, after several years of great rarity, has become frequent (1930–1931–1932) on wharves at Woods Hole and Menemsha Bight, as well as dredged about the Devil's Bridge. *Fucus platycarpus* Thuret, from holding an obscure place has become an abundant and constant feature upon the rocks, usually nearer the high tide line than *F. vesiculosus* L.—W. R. T.

NEW RECORDS OF MARINE ALGAE.—Two very extraordinary records were established during a dredging trip taken to the neighborhood of Devil's Bridge, off Gay Head, Marthas Vineyard, Massachusetts, on the 8th of July, 1931. The first of these concerns *Tilopteris Mertensii* (Sm.) Kg. (Plate 274, fig. 2, 3). One larger piece 6 cm. in length, and few smaller pieces were secured. The material was in good condition, abundantly branched and with very numerous and characteristic monosporangia. This appears to be a new record of this plant and of the family (Tilopteridaceae) to which it belongs, since no record of any representative of the family in America is known to the writer. The plants grew in relatively shallow water, accompanied by *Hildenbrandia Prototypus* Nardo, *Sphacelaria plumigera* Holmes, Schizonema colonies of diatoms, and other algae. The stones were dredged abundantly and discarded in the field, excepting a few pieces kept for the *Hildenbrandia* or other obvious algae. The presence of the two novelties was not noted until close examination took place in the laboratory, and probably much more material was thrown away.

The second novelty is determined as *Sphacelaria plumigera* Holmes, (Plate 274, fig. 1, 4) with some caution in view of the sterile state of the specimens. Associated with *Tilopteris*, several small pieces were detached from a few stones remaining from large hauls chiefly discarded in the field. The branching and general features of the plant lead one to expect to place it among *S. plumigera*, *S. plumosa*<sup>ula</sup> or small *Chaetopteris plumosa*. The second is eliminated as a possible name, since in that species the cortical cells are not transversely subdivided, as was the case in our material. The choice between the other two was hard to make, in the sterile state and considering the possibility of its representing juvenile *Chaetopteris*. The decision rests mainly on structural features developed in Sauvageau's monograph.<sup>1</sup> It

<sup>1</sup> Sauvageau, C. Remarques sur les Sphacelariacées. Jour. de Bot. 14, 15, 16, 17, 18. 1900–1904. Continued as separate publication, completed 1914.



appears that in fertile condition separation is easy, since sporangia occur on the primary ramuli in the Sphacelaria, and only on ramuli from the rhizoidal outer cortex (somewhat as in Cladostephus) in Chaetopteris. Lacking fruit, an effective vegetative character appears in the manner of origin of the rhizoids which form the cortex. In *S. plumigera* (Sauvageau v. **15**, p. 111–116, fig. 22d) all the rhizoids are formed in the plane of the distichous ramuli, and while they later envelope the axis, at first its upper and lower faces are naked. In *C. plumosa* (Sauvageau v. **15**, p. 144–149) they appear indiscriminately all about the axis from the beginning, and seem also to form a heavier and firmer cortex. Again, in examining the margins of the basal disk-like hapteral portions of these species one finds that *S. plumigera* has cells from one-half as long as wide to equal in this respect (Sauvageau v. **15**, fig. 22a), while in Chaetopteris these marginal cells are longer than broad, to twice as long (Sauvageau v. **15**, fig. 24a). In both of these distinctive features, as in more intangible matters of aspect, the Devil's Bridge plants clearly resemble *S. plumigera*, and this is apparently a first record of the plant for America.

In addition to the description in Sauvageau's paper, the writer was able to confirm his opinion by comparison with the specimen of *S. plumigera* in his copy of Traill's list of Firth of Forth algae<sup>1</sup> and Kattegat material collected by Børgesen, with a few European specimens of *C. plumosa*, and American material of a plant once referred near *S. plumosa* (*S. californica* Sauv.). At a late stage in this study the writer received from Prof. H. P. Bell material brought to him from Prince Edward Island by Miss Constance MacFarlane, and correctly determined as *C. plumosa*. The piece seen by the writer was very small, but in rhizoid character conformed to Chaetopteris, and the cortex bore some old sporangia in the correct position for that genus. Chaetopteris has been recorded<sup>2</sup> from the American northwest coast, from Prince Edward Island and northward, and from Greenland as well as northern Europe.—W. R. T.

DISAPPEARANCE OF ZOSTERA IN 1932.—It was evident to many biological observers along the coast of New England that in 1932 *Zostera marina* L. was strikingly reduced from its normal abundance.

<sup>1</sup> Traill, Geo. W. A monograph of the algae of the Firth of Forth, illustrated with herbarium specimens of some of the rarer species. Publ. for Author, pp. 16 + 1, 8 spec. Edinburgh, 1885.

<sup>2</sup> Farlow, W. G. The marine algae of New England. Rept. U. S. Comm. Fish & Fisheries of 1879. Appendix A-1: 1–210. 1881.



Usually forming vast meadows in many areas, and present in some quantity nearly everywhere that suitable conditions of bottom offered, one was tempted to consider it quite absent from many of its most productive habitats. A report from Nova Scotia indicates that a similar situation has prevailed through the Maritime Provinces, the plant usually almost eliminated, with occasional areas showing a sparse growth and small areas without obvious loss. On the Maine coast about Lamoine known meadows were bare. Chatham Bay on Cape Cod, the whole Falmouth and Woods Hole district, well known meadows about West Falmouth and Sconticut Neck in Buzzards Bay; also the Elizabeth Islands to Cuttyhunk and Penikese Islands, areas on Marthas Vineyard, in many cases verified by personal observation of the writer, were nearly or quite depopulated. Practically no living *Zostera* was brought ashore by the wash; even heavy surf from an early September gale, which would have loosened much in Buzzards Bay, had there been any significant growth, cast up only occasional fragments. From the Cold Spring Harbor area information comes that at several stations, and on both sides of Long Island (N. Y.) similar conditions prevailed. While a report suggests that about Wildwood, N. J., little change in the *Zostera* growth was to be noted there, observations in Chesapeake Bay and on the nearby coast are emphatic that the *Zostera*, which is normally very abundant, was very seriously reduced, being (from June and onward) represented by scattered blades in areas usually densely covered, and with no marked reappearance during the season. Finally, as the southernmost source of information, a report from Beaufort, N. C. indicates distinct scarcity there, which in some spots was partially overcome late in the summer.

These are necessarily fragmentary observations (at least as summarized here)<sup>1</sup> of so great a coast line, but they point to a phenomenal disturbance in the whole marine sublittoral biological situation, because in the absence of this plant a notable list of animals are unable to find their preferred, or even their only suitable, attachment place, spawning ground, or food. Reports from zoölogists are quite striking in this respect. The industrial use of *Zostera* for insulation and packing materials, and as a dressing for fields in agriculture, is also intermitted. No reasoned suggestions as to the cause of the disturbance

<sup>1</sup> Information from A. G. Huntsman, H. P. Bell, D. B. Young, W. S. Schmitt, H. T. Croasdale, S. I. Kornbauser, H. G. Richards, R. V. Truitt, H. F. Prytherch, and others, is gratefully acknowledged.



are offered here. It appears that the plant reappeared (very scantily, indeed) in some of the denuded areas during the summer, and that the rhizomes were sometimes still present under the mud in the old meadows, intact, and perhaps viable. It is certain that in no considerable area did the plant, remaining dormant during early summer, reappear to full luxuriance by September.—W. R. T.

#### EXPLANATION OF PLATE 274

Fig. 1. *SPHACELARIA PLUMIGERA*, tip of axis showing distichous ramuli,  $\times 18.5$ ; fig. 2. *TILOPTERIS MERTENSII*, portion of small branch showing ultimate ramuli with monosporangia,  $\times 16.5$ ; fig. 3. *TILOPTERIS MERTENSII*, portion of main axis showing habit,  $\times 3.2$ ; fig. 4. *SPHACELARIA PLUMIGERA*, portion of plant showing habit,  $\times 7.1$ .

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### THE DISTRIBUTION OF *IRIS VERSICOLOR* IN RELATION TO THE POST-GLACIAL GREAT LAKES<sup>1</sup>.

EDGAR ANDERSON

IN connection with a study of geographical differentiation in two species of *Iris* (Anderson 1928), an attempt has been made to work out their distribution in as great detail as possible. While the survey is not yet completed, it gives promise of contributing useful evidence as to vegetational changes in glacial and post-glacial times.

*Iris versicolor* is a northern species, its distribution being roughly that of the northern coniferous forest. *Iris virginica* is a southern species which spreads up from the Gulf and the southern coastal plain to Virginia, Ohio, southern Michigan, and central Minnesota. At the western limits of their ranges, where the transition between northern coniferous forest and deciduous forest is a sharp one, the range of *Iris versicolor* coincides exactly with that of the white pine (*Pinus Strobus*). Figure 1. is compiled from my own collections and from records very kindly sent me by Prof. F. K. Butters of the University of Minnesota and by Prof. N. C. Fassett of the University of Wisconsin. It shows the western distribution of *Iris versicolor* in relation to that of the northern forest. Eastward, in Michigan, Ontario and Ohio, where the boundaries of the northern forest become less clearly defined, the ranges of *Iris versicolor* and *Pinus Strobus* show greater deviation though they are still essentially the same.

<sup>1</sup> Contribution from the Univ. of Mich. Biological Station. Published with aid of a grant to RHODORA from the National Academy of Sciences.